VARIATION IN THE SNAIL-GENUS ASHMUNELLA.

BY T. D. A. COCKERELL.

Dr. Pilsbry's interesting remarks in these *Proceedings*, 1903, pp. 193–200, prompt me to offer some observations on *Ashmunella*. The species *A. thomsoniana*, with its various races or subspecies, inhabits the mountains near Santa Fé and Las Vegas, N. M., and has lately been obtained in sufficient quantities to afford statistical data which may be expressed in curves or polygons. On June 20, 1903, Dr. M. Grabham and the present writer collected a large number of *A. thomsoniana cooperæ* on the Kin Kale Ranch, Pecos, N. M. (alt. about 6,700 feet), and on plotting out the curves of shell-diameter, it was found that the mode for *cooperæ* fell exactly between *thomsoniana* proper and *porteræ*, though there was a tendency toward a secondary mode coincident with the normal mode of *porteræ*. The following table makes the facts clear, and can be converted into a series of curves by any one who cares to do so:

ASHMUNELLA THOMSONIANA VARIETIES.

Number of Specimens

Maximum Shell-diameter in millim.	11.5	12.	12.5	13.	13.5	14.	14.5	15.	15.5	16.	16.5	17.	17.5	18.
A. thomsoniana. Near Cooper's Mill (M. Cooper).	9	49	50	51	7	1	1	..	..	..	..	..	..	..
A. t. cooperæ. Pecos (Grabham and Cockerell).	..	..	1	8	26	54	32	31	3	6	1	..	..	..
A. t. cooperæ. Flood débris of Pecos River, at Pecos (Cocke'l).	..	..	..	.	2	8	3	4	1	..	..	..	..	..
A. t. porteræ. Manzanares Creek (M. Cooper).	..	..	..	..	1	3	13	16	10	5	6	..	..	1
A. t. porteræ. Beulah, 8,000 feet (Martin D. Cockerell).	..	..	..	..	..	2	12	17	6	3	..	..	..	..

The Manzanares Creek *porterœ* represent a subvariety having the basal tooth with the outer denticle large and pointed, and the inner one quite rudimentary, a mere slight swelling; umbilicus large, broadly exposing penultimate whorl; parietal tooth strong. On the other hand, the Cooper's Mill *thomsoniana* have the basal tooth bifid as in *porterœ*, though they have the small size of typical *thomsoniana*. Whether they should be regarded as another distinct subvariety is uncertain, as so few specimens of the Santa Fé Cañon *thomsoniana* have been collected. It is to be remarked that size is not connected closely with altitude, regarding the whole series together. The large *porterœ* occupies the highest altitudes in the mountains near Las Vegas.

A single example from the débris of the Pecos river had no basal or outer denticle, and could easily have been mistaken for *A. ashmuni* (Dall).

Dr. Grabham and I dissected a number of the Pecos *cooperœ*, and found the epiphallus with a basal curve and double insertion of penis-retractor; spermatheca without any bulbous swelling at end, very variable in length, that of seven specimens measuring respectively, in mm., 29, 35, 22, 33.5, 35, 45, 31.

In the Pleistocene beds at Pecos, *Ashmunella* is represented by the very distinct form I named *pecosensis*, but the other shells found in the beds are identical with living forms, namely, *Pyramidula cooperi*, W. G. Binney, *P. cooperi depressa*, Ckll.,* *P. hemphilli*, Newc., *P. shimekii*, Pils.,* *Succinea avara*, Say,* *Vitrea indentata umbilicata*, Singley,* *Vallonia cyclophorella*, Ancey, *Pupa blandi*, Morse, *Limnœa humilis*, Say.* Those marked with an asterisk occurred only in some dark-colored beds which seem to be more recent than the red beds containing *A. pecosensis*. High up on the bluff Dr. Grabham found an apparently fossil shell of *A. t. cooperœ*, more strongly ribbed than the normal form, and thus tending toward *pecosensis*.